Performance Based Management for North Carolina's Highway System

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Performance Based Management

- Highways must be constructed, maintained and operated uniformly in NC

- Why?
  - Safety
  - Efficiency
  - Functionality
  - Leverage to increase funding & staff
  - Public Expectations

Public Expectations

- What does the public want when traveling?
  - Smooth Road
  - Safe Trip
  - No Undue Delay
  - Aesthetically Pleasing Drive

- What do you expect when you travel?

Performance Based Management

- If DOT was your Personal Business, what would you do differently?
- Are we satisfied with where we are today?
- Can we do a better job with our existing resources?
- Who is accountable?
- How do we motivate our employees and improve the efficiency of our organization?
- How can we be more strategic and less reactive?

Performance Based Management

Drivers and Considerations

- Public Expectations
- Legislative Expectations
- BOT adopts Long Range Plan
- NCDOT Business Plan
- Growing System Demands
- Budgetary Challenges
- Workforce Demographics
- Technology
- Construction Program Changes

Changes to the Highway System

1989

- 76,808 road miles
- 127,809 paved lane miles
- 16,104 miles of unpaved roads
- 16,900 structures
- 61.1 M sf bridge deck area

2005

- 78,901 road miles
- 156,536 paved lane miles
- 5,536 miles of unpaved roads
- 17,463 structures
- 72.3 M sf bridge deck area

North Carolina State Highway System

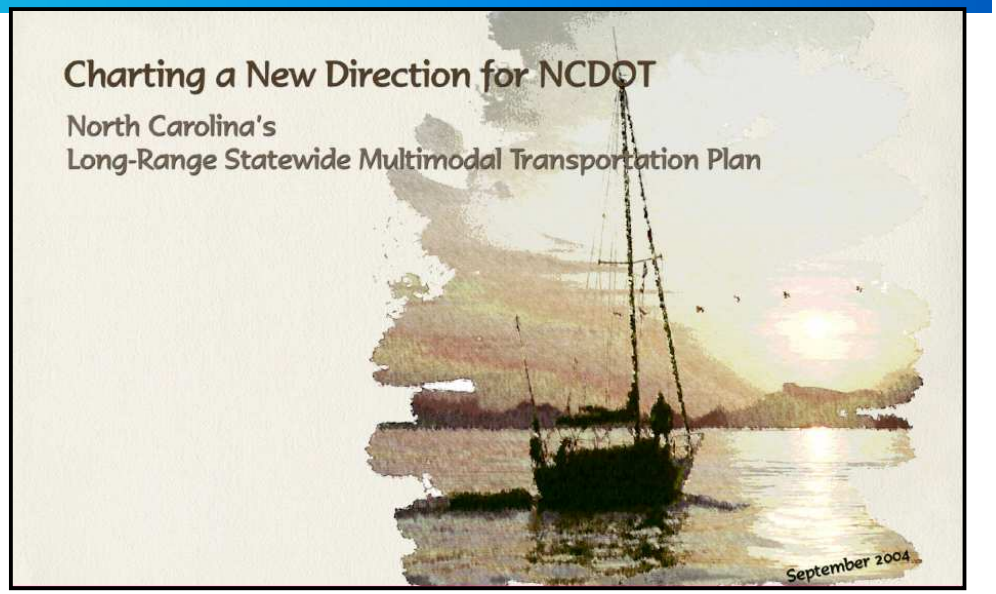
Measuring the Performance of NC's Highway System

Goals

- Move the organization from reactive to strategic/outcome based
- Clearly define mission and expectations for organization and all employees
- Develop strategies that result in improved efficiency, performance and preservation of the highway network consistent with the Statewide Long Range Plan.
- Develop a tiered approach for performance measures, expectations and appropriate levels of service.
- Develop management tools and systems to measure outcomes and performance and make appropriate adjustments
- Management flexibility with accountability

Statewide Transportation Plan

- Purpose
  - Offers Policy Guidance & Strategic Direction for NCDOT
  - Federally Mandated
  - Inventory of 25-year Transportation Needs for all modes
  - Forecast of Available Revenues
  - Opportunity to solicit Public & Stakeholder Interest
  - Outlines Long-term Transportation Investment Priorities



Statewide Transportation Plan

- Key Points
  - Plan is a long-range Investment Blueprint
    - Visionary; offers programmatic goals
    - Does not supercede the TIP process
  - Only meets 2/3 of all projected needs ($84B vs. $55B)
  - Underscores the need for investment flexibility
    - Recognizes Regional Differences
    - Maximize limited resources based on Dept. Goals
  - Focus on appropriate investment strategies by Tier

http://www.ncdot.org/doh/preconstruct/tpb/statewideplan/

(This presentation will be available on conference to download and link)

System Definitions

Long Range Plan Tiers

- **Statewide** - Facilities such as Interstates and major Primary Highways which serve long distance trips, connect major population centers, have the highest usage and primarily provide a mobility function. (7% of system (5,300 miles) carries 45% of traffic)

- **Regional** - Minor US and NC designated highways which connect regional centers and typically serve high levels of demand for short distance like commuter travel.

- **Subregional** - Minor NC routes and Secondary Roads which serve localized, short distance movements, have low demand, and provide land access to homes and businesses.

Performance Based Management

- Clearly defines organizational objectives/outcomes that employees understand
- Uses data/statistical evidence to determine progress toward established goals/outcomes
- Measures efficiency, effectiveness of organization's programs and operations (condition, quality, timeliness, reliability, etc.)
- Uses a tiered approach for performance measures, expectations and appropriate levels of service consistent with tiers in Statewide Long Range Plan
- Simple, understandable, logical, repeatable
- Shows trends over time

NCDOT Performance Measure Categories

- Bridge
- Roadside
- Maintenance
- Traffic & ITS
- Pavement
- Construction

Example: Bridge Decks

Functional Work Group Worksheet

Element: Bridge Maintenance and Preservation

Asset: Deck

Activities: Deck Maintenance

Condition Indicator: Condition Rating of less than or equal to 6.

Performance Measure: Condition Rating by Square Feet of Deck

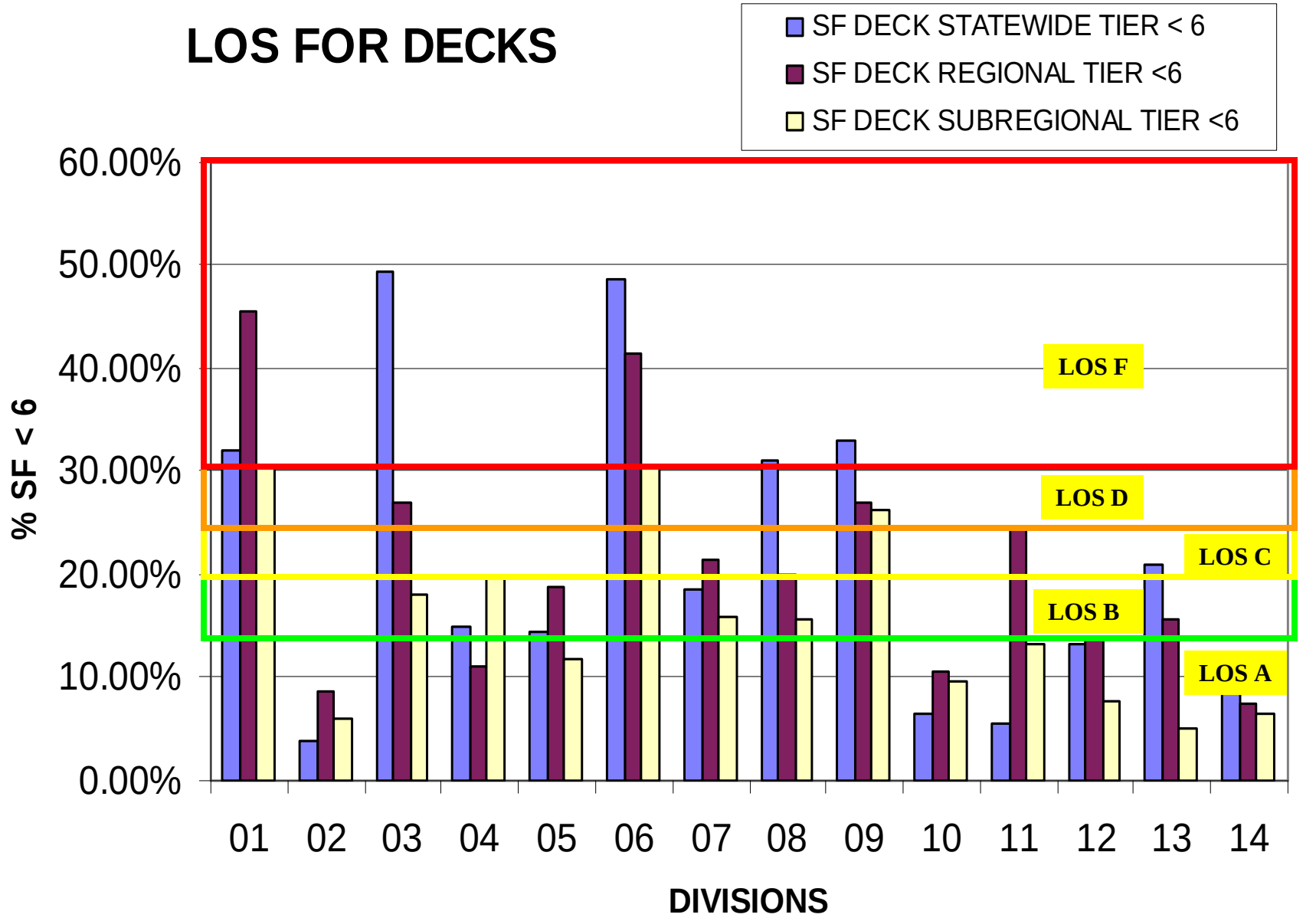
LOS Category	LOS Description
A	15% or less of condition ratings below 6.
B	Between 15.01% and 20% of condition ratings below 6.
C	Between 20.01% and 25% of condition ratings below 6.
D	Between 25.01% and 30% of condition ratings below 6.
F	30% or more of condition ratings below 6.

	Statewide	Regional	Subregional		Division	County
Performance Target	B	B	C		NA	NA
Assessment Method	BIR	BIR	BIR		BIR	BIR
Does Assessment Data exist	Y	Y	Y		Y	Y
Desired level of survey	Y	Y	Y		Y	Y
Does Feature Inventory exist	Y	Y	Y		Y	Y
Desired level of Feature Inventory	Y	Y	Y		Y	Y

Glossary
Performance Target - A performance target is a goal or objective for the condition of assets or the road system.
Assessment Method - The method recommended for appraising the asset or activity, I.e. Randon Sample, % of total, 100% assessment, etc
Does Assessment Data exist - Does the data exist and at what level.
Desired level of survey - Should the assessment be conducted down to the various management levels.
Does Feature Inventory exist - Does the numerical count of the asset exist in detail and at what management level.
Desired level of Feature Inventory - Should detail information exist for the numerical count of the asset and at what management level.

Comments:

LOS FOR DECKS



Traffic & ITS Functional Workgroup

- Workgroup Members
  - Co-chairs: Allen Pope, Kevin Lacy & Kelly Damron
  - Divisions: David Spainhour (9), Tim Boland (10), Jimmy Eatmon (4), Reuben Moore (14) & Brandon Jones (5)
  - Traffic Engineering: Greg Fuller, Ron King & Stuart Bourne
  - FHWA: Max Tate & Brad Hibbs

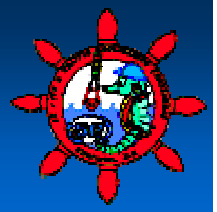
- Workgroup Charges

  -What do the public see as important Traffic and ITS Elements?

  -What should our desired Levels of Service be in these areas?

  -How can we measure these items?

10 Traffic & ITS Elements



- Pavement Markings
- Pavement Markers
- Signs (Includes Sign Lighting)
- Roadway and Interchange Lighting
- Traffic Signals
  - Operations
  - Maintenance
  - Emergency Response
- Incident Clearance
- Traveler Information
- Dynamic Message Signs

Example: Incident Clearance

Functional Work Group Worksheet

Element: Traffic & ITS

Asset: Highway

Activities: Freeflow

Condition Indicator: Road Closures

Performance Measure: Incident Clearance Times

LOS Category	LOS Description
A	90% of lane blocking incidents cleared within 30 minutes
B	90% of incidents cleared in less than 60 minutes
C	90% of incidents cleared in less than 90 minutes
D	90% of incidents cleared in less than 4 hours
F	90% of incidents cleared in more than 4 hours

	Interstates		**Primaries**	Subregional	Division	County
	IMAP Areas	Non-IMAP				
Performance Target	A	C	C	NA	NA	NA
Assessment Method	TIMS & IMAP DB	TIMS	TIMS	NA	TIMS	NA
Does Assessment Data exist	Some	Some	Some	NA	Some	NA
Desired level of survey	Annual	Annual	Annual	NA	YES	YES
Does Feature Inventory exist	YES	YES	YES	NA	YES	YES
Desired level of Feature Inventory	YES	YES	YES	NA	YES	YES

Cleared = All lanes open

Time = From occurance to all lanes open.

IMAP DB = IMAP Database

Note: Data will only reflect incidents entered into TIMS.

Incident Clearance Performance Data

IMAP Area

Statewide Tier	LEVEL OF SERVICE (LOS) RATING			Combined	Target
	County X	County Y	County Z		
Clearance	D	D	F	D	A

Non-IMAP Area

Statewide Tier	LEVEL OF SERVICE (LOS) RATING		Combined	Target
	County A	County B		
Clearance	F	F	F	C

Example data is based on 2005 TIMS Entries.

Similar to HPBM Measures, but not exactly the same.

Example: Signs

Functional Work Group Worksheet

T-3

Element:	Traffic & ITS
Asset:	Signs (Includes Sign Lighting)
Activities:	Visible and Legible
Condition Indicator:	Visible and Legible
Performance Measure:	Percent of signs that are visible and legible at night

LOS Category	LOS Description
A	Less than 8% are not visible or legible
B	9-15% are not visible or legible
C	16-23% are not visible or legible
D	24-30% are not visible or legible
F	More than 30% are not visible or legible

	Statewide		Regional		Subregional		Division	County
	R&W	G	R&W	G	R&W	G	NA	NA
Performance Target	A	A	B	B	B	C	NA	NA
Assessment Method	NS	NS	NS	NS	NS	NS	NS	NS
Does Assessment Data exist	YES	YES	YES	YES	YES	YES	Some	Some
Desired level of survey	Annual	Annual	Bi-Ann	Bi-Ann	Tri-Ann	Tri-Ann	YES	YES
Does Feature Inventory exist	NO	NO	NO	NO	NO	NO	NO	NO
Desired level of Feature Inventory	NO	YES*	NO	YES*	NO	NO	NA	NA

R&W = Regulatory & Warning

G = Guide

NS = Nighttime Survey

YES* = Large freeway type signs, ie those with significant replacement costs

Sign Performance Data

	Interstate		Primary		Secondary	
Item	Goal	Actual	Goal	Actual	Goal	Actual
Signs	B	B	C	B	C	C
Striping	B	C	C	C	C	D
Words & Symbols	B	F	C	A	C	A
Markers	B	F	B	F	B	F

Example data is based on 2004 Maintenance Condition Assessment.

Similar to HPBM Measures, but not exactly the same.

Traffic & ITS Elements

ELEMENT	MEASURE	METHOD
Markers	Present Adequately Reflective	Nighttime Survey
Markings	Visible	Nighttime Survey
Signs	Visible Legible	Nighttime Survey
Lighting	Operational	Nighttime Survey
Incident Response	Clearance Time	TIMS
Traveler Information	Notification Time	TIMS
Dynamic Message Signs	Reliability Preventative Maintenance	DMS Software Logs

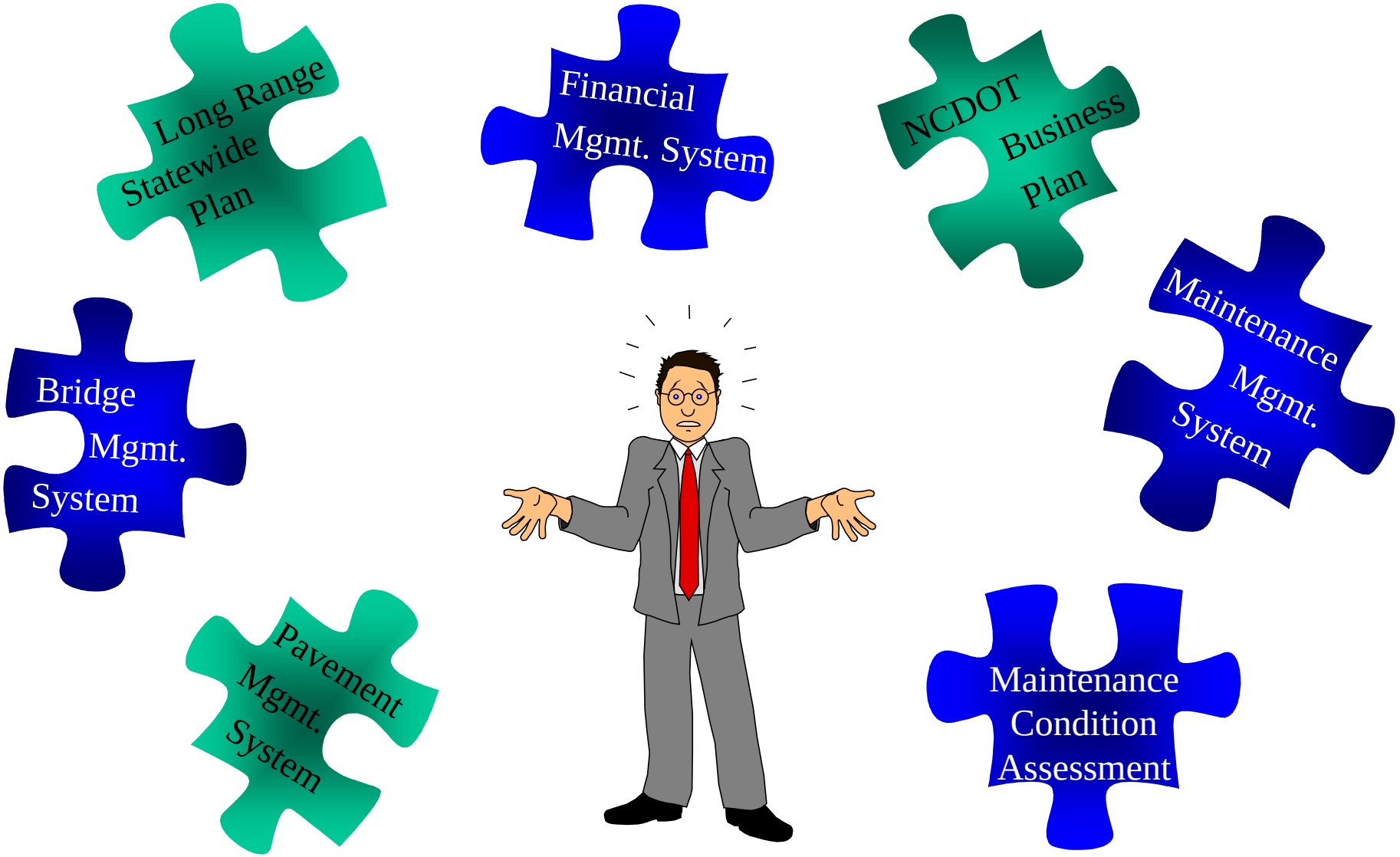
Traffic & ITS Elements

ELEMENT	MEASURE	METHOD
Signal System Operations	System Monitoring Detectors Timing Plans & Event Schedules	Signal System Logs
Signal Routine Maintenance	Loops Preventative Maintenance Conflict Monitors	Signal Inventory Program
Signal Emergency Response	Trouble Calls Missing Displays Knockdowns	Signal Inventory Program

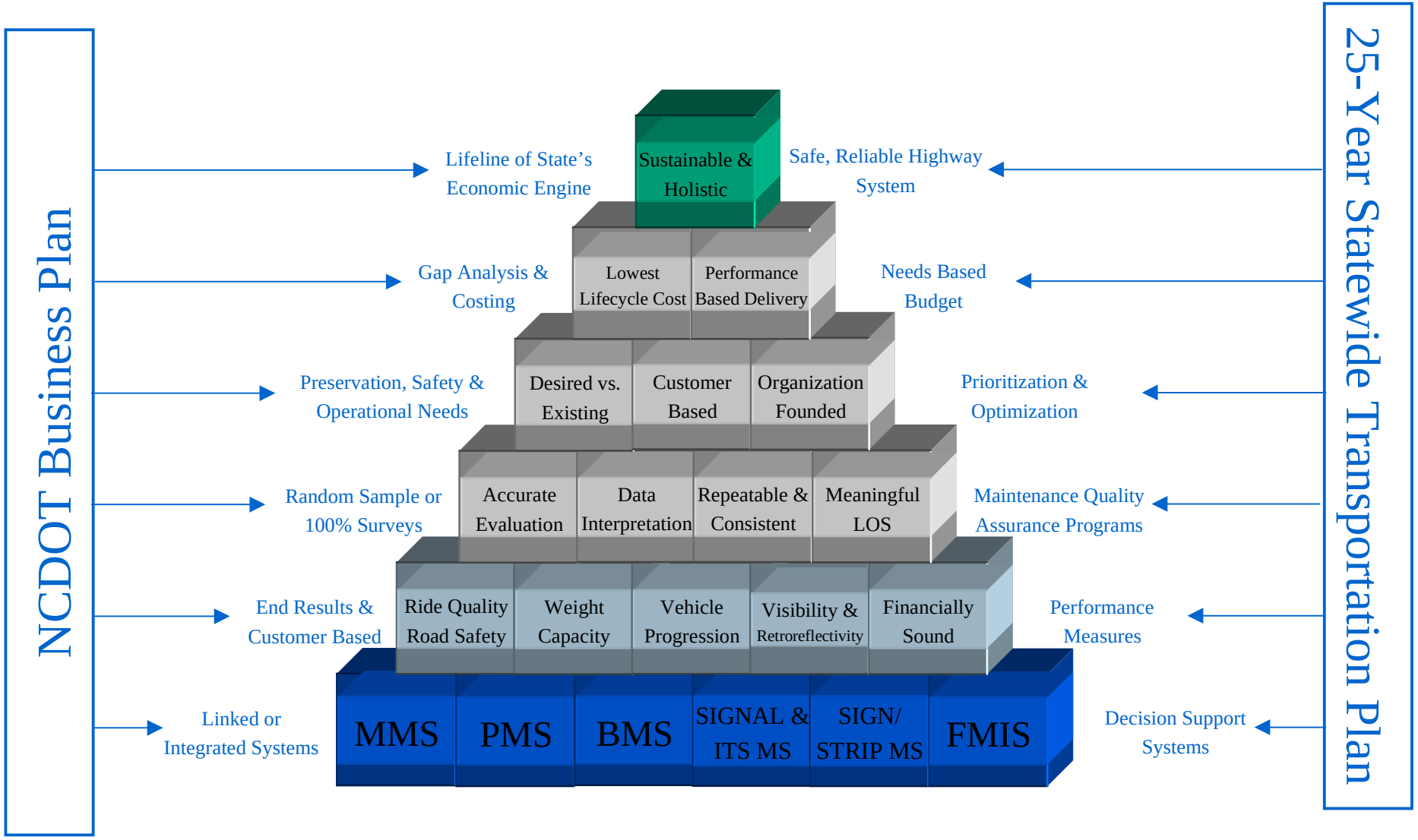
Measuring the Performance of NC's Highway System

AREA	MEASURE	METHOD
Maintenance	Level of Service	MCA Index
Pavements	Smoothness Condition	IRI PCR (PMS)
Bridges	Deficient Structures	Sufficiency Rating (BMS)
Operations	Signal System Perf. Incident Response	Composite Index Clearance Times (TIMS)
Aesthetics	Litter, Plantings, Rest Areas	Aesthetic Quality Index
Program Delivery	Quality, Cost, Completion	Composite Index (HiCams, SAP)
Highway Safety	Crash Rates	Accident History (TEAS)

How do the Pieces Fit Together

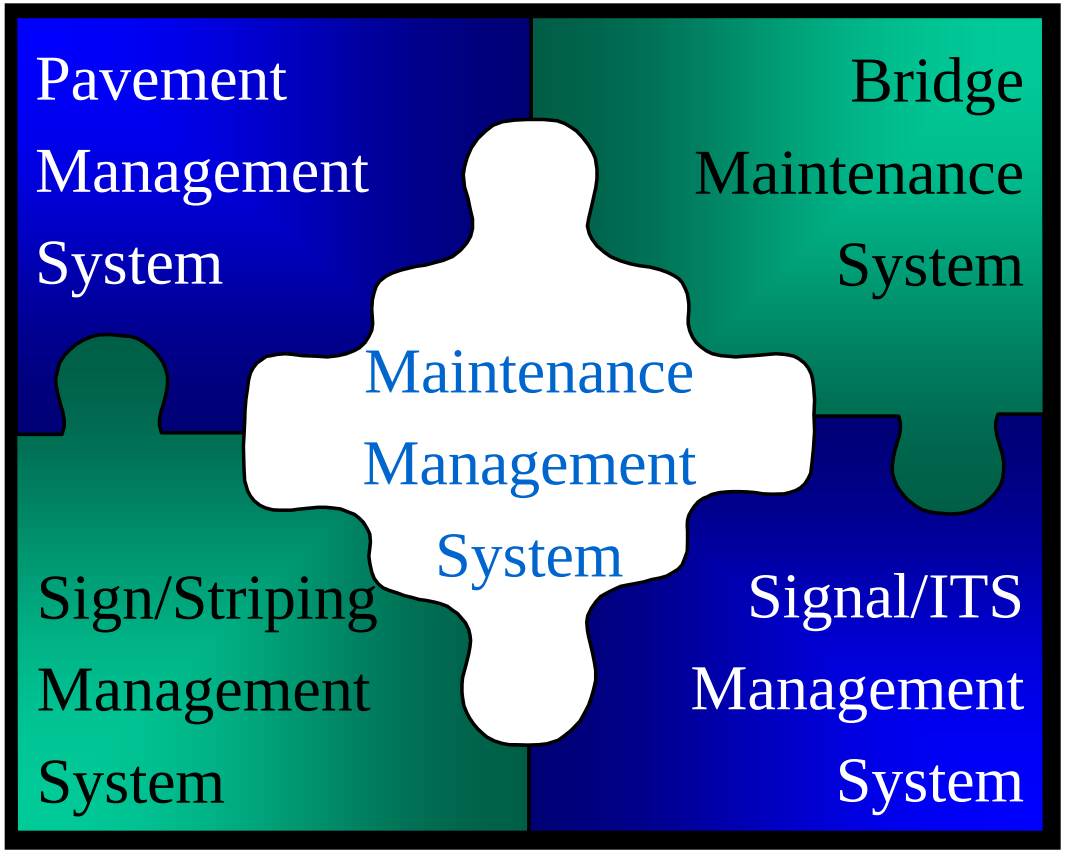


Building Blocks of HPBM



Management Systems Deployment

Financial Management System



Feedback Please!

What do you see as obstacles to

- meeting our desired Levels of Service for Traffic & ITS Items?
- making a Performance Based Management system work in NCDOT?

Performance Based Management

What will make this work?

- Buy in from all levels
- Long Term Approach
- Realistic, attainable goals that are clearly defined and easily measured
- Incremental gains vs. miracles
- Build on success of other Goal Oriented Programs (Sec. Roads, NCMA, SB 1005)
- Training and Communication

Results, Benefits and Expectations

- Shift to an Outcome Based approach
  - Clearly established goals & measures
    - Target Levels of Service by Tier
    - Performance expectations for all employees
  - Increased accountability and flexibility
  - Move from re-active to planned approach
  - Focus on long term results with incremental gains
  - Increased focus on Preventive Maintenance

- Data will drive decision making
  - Pushed down in the organization
  - Encourages “right sizing” of organization
  - More accurately validated funding needs

Results, Benefits and Expectations

- Highest & best use of resources
  - Efficiency
  - Operate more like a business
- Uniformly constructed, maintained & operated Highway System

Questions?

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